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THE DATE OF CODEX SINAITICUS

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Abstract

Codex Sinaiticus is generally described as one of 'the great fourth century majuscule Bibles', and its construction is often assigned to a more precise date in the middle of the fourth century. This essay surveys the evidence for the date of production of the codex and concludes that it could have been produced at any point from the early fourth century to the early fifth century. This time span may seem uncomfortably wide, but this particular range of dates makes Codex Sinaiticus an ideal candidate for AMS radiocarbon analysis. The shape of the radiocarbon calibration curve during this period means that a well-executed radiocarbon analysis of the codex should have the potential to shed further light on the date the codex was produced.

1. Introduction

Along with Codex Vaticanus Graecus 1209, Codex Sinaiticus is generally described as the most ancient surviving basically 'complete' Christian Bible.[1] Both codices are written in textbook examples of the 'Biblical Majuscule' script, and both are typically assigned by scholars to the fourth century, usually near the middle of the century.[2] This dating represents a consensus reached

[1] Thanks to the organizers of the Text and Transmission Joint Research Seminar at KU Leuven and Ghent University for the opportunity to present portions of this material to a wide audience that provided helpful feedback. I am also indebted to Hugo Lundhaug, Gregg Schwendner, Mary Jane Cuyler, and Zachary J. Cole for comments on earlier drafts of this essay. Thanks also to the *JTS* production team for overcoming a variety of formatting challenges. This work was supported by the Research Council of Norway (project number 314240).

[2] The online catalog entry for Codex Sinaiticus at the British Library (Add MS 43725) lists the date of the codex as '2nd quarter of the 4th century – 3rd quarter of the 4th century' (<http://searcharchives.bl.uk/IAMS_VU2:IAMS032-002169711>). The 'Reference Guide' accompanying the 2010 photographic facsimile of Codex Sinaiticus comments only that 'Codex Sinaiticus is generally dated to the fourth century, and sometimes more precisely to the middle of that century. This is based on a study of the handwriting'. A recent collection

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about a century ago, after a period when opinions about the age of Codex Sinaiticus varied somewhat.

When Constantine Tischendorf presented the first leaves of Codex Sinaiticus to the world in 1846, he described them as a product of the middle of the fourth century.[3] When he later gained access to the bulk of the remaining leaves of the codex, Tischendorf identified the work of four discreet copyists in the original text of the codex (scribes A, B, C, and D).[4] In addition, he identified a number of correctors, judging some of the corrections as contemporary with the production of the codex and others rather later.[5] He maintained a date for the production of the codex in the fourth century while allowing some leeway on whether it should be assigned to the first or second half of the century.[6]

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of essays produced by the British Library and dedicated to Codex Sinaiticus contained almost no discussion of the date of the codex, just a summary statement: 'There is a strong consensus that Codex Sinaiticus belongs to the fourth century, and there are no good grounds to dispute that'. See Harry Gamble, 'Codex Sinaiticus in its Fourth Century Setting', in Scot McKendrick, David Parker, Amy Myshrall, and Cillian O'Hogan (eds.), *Codex Sinaiticus: New Perspectives on the Ancient Biblical Manuscript* (London: The British Library, 2015), pp. 3–18, at p. 6.

[3] Constantinus Tischendorf, *Codex Friderico-Augustanus sive fragmenta Veteris Testamenti* (Leipzig: Koehler and Uckermann, 1846), p. 22: 'cum magna veritatis specie medio fere seculo quarto eum adscripturus mihi videor'.

[4] The number of copyists involved in the production of Codex Sinaiticus is a matter of ongoing discussion. See D. C. Parker, *Codex Sinaiticus: The Story of the World's Oldest Bible* (London: British Library; Peabody, Mass.: Hendrickson, 2010), pp. 48–51.

[5] On the various correctors, see most recently Parker, *Codex Sinaiticus*, 79–90.

[6] See Constantin Tischendorf, *Nachricht von der im Auftrage seiner kaiserlichen Maiestät Alexander II unternommenen herausgabe der Sinaitischen Bibelhandschrift* (Leipzig: Giesecke & Devrient, 1860), p. 18: 'Hierauf hab' ich eine Mittheilung über das Alter der Handschrift verheissen; sie soll jedoch auf wenige Hauptstücke beschränkt bleiben, indem alles Ausführlichere für die Prolegomena aufzusparen ist. Vor Allem kann ich nur mit Nachdruck wiederholen was ich bereits bei der ersten ins Vaterland gegebenen Kunde von dem aufgefundenen Schatze von Cairo aus geschrieben: "Für diese Handschrift nun bedarf es wenigstens zur Feststellung des Jahrhunderts ihrer Entstehung kaum eines Datums; denn dass sie im vierten christlichen Jahrhundert geschrieben sei, das lässt sich mit allen Argumenten, die in der paläographischen Wissenschaft gelten, fast ausser allen Zweifel stellen." Bei der genaueren Untersuchung kann nur das Eine zweifelhaft sein, ob die Handschrift schon vor der Mitte des vierten Jahrhunderts oder erst in der zweiten Hälfte desselben geschrieben sei'. For the more extended arguments in the *Prolegomena* to his facsimile edition, see Constantinus Tischendorf, *Bibliorum Codex Sinaiticus Petropolitanus* (4 vols.; St. Petersburg, 1862), pp. 1.11*–1.14*.

Some prominent authorities at the time assented to Tischendorf's date.[7] Yet, the view was not immediately embraced by all. We may set aside as unfounded the claims of modern forgery made by Tischendorf's contemporary and nemesis, Constantine Simonides, and turn to the noted palaeographers who expressed opinions in the coming years and decades.[8] In 1893, Edward Maunde Thompson, principal librarian of the British Museum, pronounced that the copying of Sinaiticus 'may be placed early in the fifth century'.[9] By 1912, he had revised his opinion: 'The period of the manuscript may be the latter part of the fourth century'.[10] There is a record of Harold Idris Bell offhandedly referring to Sinaiticus as 'early fifth century' in 1909.[11] At about the same time, the papyrologist Arthur S. Hunt inclined toward an earlier date. Kirsopp Lake cited him in the introduction to his photographic facsimile of Sinaiticus: 'Dr. Hunt, indeed, expressed the view that if it had not been for the evidence of the Eusebian apparatus he should have not regarded the third century as an impossible date'.[12] The most thorough students of the codex, H. J. M. Milne and Theodore C. Skeat, concluded that the codex was produced

[7] For instance, the British New Testament textual critic Samuel Tregelles, despite having a strained relationship with Tischendorf, agreed with the fourth century assignment. After examining the New Testament leaves in Leipzig in 1862, he wrote: 'I believe I know something of Greek MSS and I am positively convinced that this is a manuscript of the fourth century'. See Timothy C. F. Stunt, 'Some Unpublished Letters of S. P. Tregelles Relating to the Codex Sinaiticus', *The Evangelical Quarterly* 48 (1976), pp. 15–26, at p. 19. See also Frederick H. Scrivener, *A Full Collation of the Codex Sinaiticus with the Received Text of the New Testament* (London: Bell and Daldy, 1864), pp. xiii-xl, at p. xxix: 'Codex Sinaiticus is coeval with its rival in the Vatican, and consequently a record of the fourth century of the Christian era.' Scrivener had not seen the manuscript himself. He based his judgements primarily on the 17 reproductions published in the first volume of Tischendorf, *Bibliorum Codex Sinaiticus Petropolitanus*.

[8] On Simonides, see J. Keith Elliott, *Codex Sinaiticus and the Simonides Affair* (Thessaloniki: Patriarchal Institute for Patristic Studies, 1982).

[9] Thompson, *Handbook of Greek and Latin Palaeography* (New York: D. Appleton, 1893), p. 150.

[10] Thompson, *An Introduction to Greek and Latin Palaeography* (Oxford: Clarendon, 1912), p. 200.

[11] Bell, 'Early Codices from Egypt', *The Library* 10 (1909), pp. 303–13, at p. 307.

[12] See Lake, *Codex Sinaiticus Petropolitanus: The New Testament, The Epistle of Barnabas, and the Shepherd of Hermas* (Oxford: Clarendon, 1911), p. x.

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after the development of the Eusebian canon numbers but 'before the middle of the [fourth] century'.[13]

This dating of the codex near the middle of the fourth century is now customary. In fact, the writing of Codex Sinaiticus is now usually regarded as a relatively fixed point in the chronological development of the 'Biblical Majuscule' script. Colin H. Roberts included it in his list of securely datable samples of Greek handwriting in his *Greek Literary Hands* (1956) with a suitably broad date of 'fourth century' on the basis of three relatively objective criteria, which will be outlined in detail below.[14] In 1967, Guglielmo Cavallo argued for a much more precise date 'of about 360, or just a few years later' on the basis of his view of the position of the handwriting of Sinaiticus in the evolution of the Biblical Majuscule script.[15] Theodore Skeat, on the other hand, has argued more recently that Codex Sinaiticus (and Codex Vaticanus) can be dated just as precisely, but to a period some thirty years earlier (just after 330) because he regarded these codices as examples of the books that the emperor Constantine ordered Eusebius of Caesarea to produce (Eusebius, *Life of Constantine* 4.36).[16]

The arguments of Roberts, Cavallo, and Skeat represent three distinct methods for assigning a date to Codex Sinaiticus—the use of relatively objective criteria presented by Roberts (to be discussed in detail below), the use of a framework of palaeographic development argued by Cavallo, and Skeat's proposed matching of surviving ancient artifacts with objects mentioned in a literary account. Of these three, the approach of Roberts is far and away the least problematic.

[13] See Milne and Skeat, *Scribes and Correctors of the Codex Sinaiticus* (London: The British Museum, 1938), pp. 60–65. The arguments of Milne and Skeat will be treated in detail below.

[14] Colin H. Roberts, *Greek Literary Hands 350 B.C. – A.D. 400* (Oxford: Clarendon, 1956), p. 24.

[15] Guglielmo Cavallo, *Ricerche sulla maiuscola biblica* (Florence: Le Monnier, 1967), pp. 58–61: phrased variously, as 'una data intorno al 360 ca. o solo di qualche anno più tarda' (p. 58) or 'intorno al 360 ca. o poco più tardi' (p. 60). A similar date—'IV^2 (ca. 360)'—has been advocated on palaeographic grounds more recently by Pasquale Orsini, *Manoscritti in maiuscola biblica: Materiali per un aggiornamento* (Cassino: Edizioni dell'Università degli Studi di Cassino, 2005), p. 240.

[16] Theodore C. Skeat, 'The Codex Sinaiticus, the Codex Vaticanus, and Constantine', *JTS* 50 (1999), pp. 583–625. This view is common, but to my knowledge nobody has argued the point as thoroughly as Skeat.

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Strong reasons exist for being skeptical of using a framework of linear palaeographic development to provide precise dates for Greek manuscripts of the Roman era in general and for the 'Biblical Majuscule' specifically. As Timothy Janz has pointed out, 'It is notable that Cavallo's entire reconstruction of the "formation" of the canon [of the Biblical Majuscule] is not, and cannot be, corroborated by any objective evidence, due to the lack of dated exemplars'.[17] The particular case of Codex Sinaiticus with its multiple copyists highlights the problem with attributing too much chronological value to minute graphic differences in scripts, as Milne and Skeat remark: 'The dangers of judging age on grounds of style are nowhere better illustrated than in the Sinaiticus itself, where the hands of scribes A and B present a markedly more archaic appearance than that of scribe D; *did we not know that all three were contemporary, D might well have been judged half a century later than A and B*'.[18] This striking observation is a reminder that we should be suspicious when high-precision dates for this type of writing are proposed based only on palaeography.

Skeat's more recent historical arguments that Codex Sinaiticus and Codex Vaticanus were among the books produced in response to Constantine's order to Eusebius have been cautiously accepted in some quarters.[19] Yet, his case is far from compelling and is open to question from many angles. To name just one especially salient objection, Harry Gamble has pointed out that the contents of neither Sinaiticus nor Vaticanus match the list of acknowledged 'New Testament' writings outlined by Eusebius.[20] This point

[17] Timothy Janz, 'Greek Paleography: From Antiquity to the Renaissance' (<https://spotlight.vatlib.it/greek-paleography/feature/1-majuscule-bookhands>). See also the review of Cavallo by Peter J. Parsons in *Gnomon* 42 (1970), pp. 375–80. For general caution about the use of palaeographic evidence to generate narrow date ranges for Greek literary manuscripts of the Roman era, see Brent Nongbri, 'Palaeographic Analysis of Codices from the Early Christian Period: A Point of Method', *JSNT* 42 (2019), pp. 84–97; Brent Nongbri, *God's Library: The Archaeology of the Earliest Christian Manuscripts* (New Haven: Yale University Press, 2018), pp. 47–82; and Christian Askeland, 'Dating Early Greek and Coptic Literary Hands', in Hugo Lundhaug and Lance Jenott (eds.), *The Nag Hammadi Codices and Late Antique Egypt* (Tübingen: Mohr Siebeck, 2018), pp. 457–89.

[18] Milne and Skeat, *Scribes and Correctors*, p. 62, my italics.

[19] See, for instance, Anthony Grafton and Megan Williams, *Christianity and the Transformation of the Book: Origen, Eusebius, and the Library of Caesarea* (Cambridge, Mass.; Belknap, 2006), pp. 215–21.

[20] Gamble, 'Codex Sinaiticus in its Fourth Century Setting', p. 9. This point was recognized already by Brooke Foss Westcott and Fenton John

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alone casts doubt upon the cogency of Skeat's historical argument, and D. C. Parker has raised several additional objections to Skeat's reasoning.[21]

Only the methodology of Roberts can provide firmer ground for establishing a range of possible dates for the codex. Even here, however, we encounter some difficulties. This essay evaluates the 'objective' evidence for assigning a date to Codex Sinaiticus and suggests one possible way forward in the form of radiocarbon dating.

2. The 'Objective' Criteria for Dating Codex Sinaiticus

To establish the 'fourth century' date, Roberts referred exclusively to the landmark study published by H. J. M. Milne and Theodore Skeat in 1938, *Scribes and Correctors of the Codex Sinaiticus*, which provides a detailed argument that Codex Sinaiticus was likely copied 'before the middle of the [fourth] century.' Here is how Roberts summarized their arguments in three points:

> a. A *terminus post* of *c.* A.D. 300–40 is provided by the Eusebian sections.
> b. Certain cursive notes, one of which can be seen in our plate (col. ii, l. 12), are in a distinctively fourth-century hand.
> c. The system of representing numerals points to a fourth-century date. In this century the practice of representing, for example, 1,000 by a stroke below the letter *A* ($\underline{A}$) replaces the old system of putting a curl above the letter ($\dot{A}$). Milne and Skeat assign this change approximately to the years 338–60. As the codex was written to dictation and as it is certain that in some places in the exemplar the numerals were written out in full, the use of the old system is evidence of fourth-century date.[22]

Roberts thus provided a concise précis of the more 'objective' arguments for the date of the codex. In what follows, I will argue that point (a) is valid, point (c) is invalid, and point (b) is

Anthony Hort, *The New Testament in the Original Greek: Introduction, Appendix* (Cambridge: Macmillan, 1882), p. 74.

[21] See the critical discussion in Parker, *Codex Sinaiticus*, pp. 19–24.

[22] Roberts, *Greek Literary Hands*, p. 24.

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considerably more complicated than Roberts lets on. I will discuss the arguments in that order (a, c, b).

The *terminus post quem* mentioned by Roberts (the presence of the Eusebian canon and section numbers) is not controversial. The Eusebian apparatus as it appears in Sinaiticus has some anomalous features, but it seems almost certain that the Eusebian numbers were a part of the original production of the codex and not a later addition.[23] The surviving evidence suggests that the Eusebian numbers were added after an early correction of the manuscript by scribe D but before the insertion of a replacement bifolium (again by scribe D) in the second quire of Matthew.[24] The use of the canon and section numbers cannot predate their creation by Eusebius. The exact date that Eusebius developed and disseminated the system of canon and section numbers is not precisely known, but the *terminus post quem* of 300–340 offered by Roberts is reasonable.[25]

[23] The strange features include (1) the fact that no Eusebian canon tables survive in Sinaiticus, either at the mutilated beginning of the codex or at the start of the New Testament, (2) the section numbers are only partially present (they are missing for sections 107–242 in Luke), and (3) the first 52 sections in Matthew are more elaborately executed than the rest of the sections. Milne and Skeat have explained this situation by noting that, according to one sequence of quire signatures, there is a full quire missing between the last quire of the Old Testament and the first quire of the New Testament. They hypothesize that a quire containing a set of tables was planned for but never completed because the effort to add the section numbers was abandoned before it was finished, thus also explaining the abandonment of the extra decorations after section 53 in Matthew and the complete lack of Eusebian numbers in much of Luke (*Scribes and Correctors*, pp. 7–9 and 36–7). In the absence of other data, this solution seems the least implausible alternative (if the canon tables had been completed and contained in the codex, it is hard to explain why the missing section numbers in Luke were not added by any later users of the codex).

[24] A correction in the lower margin at Matt. 10:39 carries a section number in identical red ink and made in sequence with the section numbers used in the main text, quire 74 (=New Testament quire 1), folio 6r, column 3. The bifolium consisting of New Testament folios 10 and 15 is part of a quire copied by scribe A, but this single bifolium is copied by scribe D and lacks the Eusebian numbers (the surrounding leaves copied by scribe A all have the Eusebian numbers). See the discussion in Milne and Skeat, *Scribes and Correctors*, p. 36.

[25] Compare the phrasing of Kirsopp Lake: 'It is unfortunate that we do not know the exact date when Eusebius made his apparatus, but it is at least plain that the first quarter of the fourth century is the earliest date which has any reasonable probability' (*Codex Sinaiticus*, pp. ix–x). See further Matthew R. Crawford, *The Eusebian Canon Tables: Ordering Textual Knowledge in Late Antiquity* (Oxford: Oxford University Press, 2019), pp. 79–80, especially n. 73.

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Less compelling is the argument that Roberts mentions in connection with changing customs of representing numerals. Roberts notes that over the course of the fourth century, one system of representing multiples of 1,000 with a curl (*Ȧ*) was replaced by a new system using a stroke (*/A*). Roberts concluded that 'as the codex was written to dictation and as it is certain that in some places in the exemplar the numerals were written out in full, the use of the old system is evidence of fourth-century date'. There are at least two problems here. It will be useful to review what Milne and Skeat actually wrote in some detail:

> The second point is the forms of certain numerals used in the text of 1 Maccabees. In the course of the fourth century the old method of representing the figures 1,000–9,000 by the ordinary cardinal numbers for 1–9 with a surmounting curl or crest (e.g. Ȧ = 1,000, Ḃ = 2,000, etc.) gradually went out of fashion, the curl being replaced by a simple slanting stroke to the left of the numeral (e.g. /A or /A = 1,000). ... [Milne and Skeat then provide a table of dated papyri to show the window of dates for the shift.] From these data it can be seen that the change from the old to the new system took place about the years A.D. 338–60. In the Sinaiticus we still find the earlier system, B̈ in O.T. 47, col. 1, and Ḧ in O.T. 43, col. 1, and 47, col. 1. All these occur in 1 Maccabees; elsewhere thousands are written out in words, as regularly in the Vaticanus. We may reasonably assume that in 1 Maccabees at least these numbers were represented by numerals in the exemplar, since this alone can explain the erroneous *τρισχιλίους δέκα* for *ὀκτακισχιλίους* in 1 Macc. v. 34 (i.e. Ḧ I for Ḧ), and the extraordinary series of numerals in 1 Macc. v. 20 quoted above (p. 57). It might in consequence be argued that the shapes of the numerals in the exemplar had influenced the copyist of the Sinaiticus. But now that we have shown that the manuscript was written from dictation, this possibility is all but excluded, and we can have confidence in the validity of the scribe's own shapes as a criterion. If this is so, the Sinaiticus is not likely to be much later than about A.D. 360.[26]

First, as far as I can see, Milne and Skeat do not claim that 'it is certain that in some places in the exemplar the numerals were written out in full', as Roberts asserts. Rather, Milne and Skeat note that outside this small number of examples in 1 Maccabees, thousands are spelled out as words *within* Codex Sinaiticus itself. The fact that this older system using numerals with curls is present *only* in 1 Maccabees suggests that a copyist simply carried them over from an exemplar. Although Milne and Skeat mentioned this seemingly reasonable explanation, they rejected it

[26] Milne and Skeat, *Scribes and Correctors*, pp. 62–4.

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because they believed that Codex Sinaiticus had been copied by dictation rather than sight.

This brings us to the second major problem. For the logic of Milne and Skeat's argument about numerals to be convincing, *it is necessary to assent that Sinaiticus was copied by dictation*. But the argument of Milne and Skeat in favor of dictation has proven persuasive to almost nobody.[27] Indeed, a recent article in the *Journal of Biblical Literature* has demonstrated that what Skeat regarded as 'positive proof of dictation' (the nonsense sequence of characters in 1 Macc. 5:20) was in fact based on a mistaken reading by Milne and Skeat.[28] Barring some new and compelling evidence that Sinaiticus was copied by dictation, the argument about the orthography of numbers can carry no weight at all in the question of the date of the copying of the codex.

The other argument mentioned by Roberts, the presence of 'certain cursive notes' in 'a distinctly fourth century hand' also deserves more intensive scrutiny. Here is what Milne and Skeat say on the matter:

> In the marginal additions made by scribe D while correcting the New Testament the directional signs are frequently supplemented with the words ανω and κατω, the former being placed in the lower margin and the latter opposite the place in the text (N.T. 2^{b}, 66^{b}, 73, 74, 80, 82, 92). These words are written in cursive script (no doubt to distinguish them from the text proper), and slender though the evidence of a few isolated words must be, they certainly belong to the fourth century, and probably the first half of it.[29]

In a footnote, Milne and Skeat dispute Tischendorf's identification of the writer of these 'cursive' words and offer their own attribution:

> These are attributed by Tischendorf (Prolegomena, p. 9*) to the corrector B^{a}, but identity of ink and the fact that they accompany only corrections

[27] See, for example, Lake's review of Milne and Skeat in *Classical Philology* 37 (1942), pp. 91–6, at pp. 94–5; Parker, *Codex Sinaiticus*, pp. 54–5; and especially Dirk Jongkind, *Scribal Habits of Codex Sinaiticus* (Piscataway: Gorgias Press, 2007), pp. 250–52.

[28] Zachary J. Cole, 'An Unseen Paleographical Problem with Milne and Skeat's Dictation Theory of Codex Sinaiticus', *JBL* 135 (2016), pp. 103–7. For the quotation from Skeat, see Theodore C. Skeat, 'The Use of Dictation in Ancient Book Production', *PBA* 42 (1956), pp. 179–208, reprinted in J. K. Elliott (ed.), *The Collected Biblical Writings of T.C. Skeat* (Leiden: Brill, 2004), pp. 3–32, at p. 17.

[29] Milne and Skeat, *Scribes and Correctors*, p. 62.

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by D make it certain that they are from his hand. One isolated example of κατ(ω) by scribe A is on NT 40[b].[30]

Thus, in seven instances these 'cursive' notes accompany corrections by scribe D, and in one instance they are found with a correction by scribe A. The identification of this 'cursive' hand with that of scribe D is made by 'identity of ink' used for the corrections by scribe D and the 'cursive' notes.[31] The question, then, is this: Can these notes be assigned with confidence to the fourth century or even more narrowly to the first half of the fourth century? Before answering these questions it is important to get a sense of the size of these notes relative to the writing of the text block in Codex Sinaiticus (see Fig. 1):

As Fig. 1 illustrates, we are dealing with very small writing. Letters measure between 1 and 2 mm in height and are written in ink that is sometimes quite pale. We should also gain a better sense of the quantity of writing at issue. Fig. 2 provides images of all the 'cursive' examples listed by Milne and Skeat.

As the images indicate, it is not so much the case that we are dealing with 'a few isolated words' as with a few, often barely legible, *letters*. In fact, the sweeping judgment of Milne and Skeat is based on a sample containing just five different letters (*alpha*, *kappa*, *nu*, *tau*, and *omega*). Milne and Skeat were respected scholars, but I wonder at how they were able, using only these five letters, to say that the notes 'certainly belong to the fourth century, and probably the first half of it'. The evidence presented below suggests that we should not share their confidence.

[30] Milne and Skeat, *Scribes and Correctors*, p. 62 n. 1. Lake seems to have assigned the corrections associated with these cursive notes to corrector A^2, whom he regarded as 'almost certainly identical with scribe D'. See Lake, *Codex Sinaiticus*, Plate II (for the assignment of one of these corrections to corrector A^2) and p. xxii (for the identification of corrector A^2 and scribe D).

[31] I have not been able to inspect the relevant leaves in person to judge the question of the identity of the ink, so I must defer to the judgement of Milne and Skeat on this point at present. It should be noted that this is an area in which chemical analysis of the ink would be a *very* useful undertaking. I am grateful to Jesse Grenz for alerting me to the presence of similar notes on four pages in Codex Vaticanus, a fact of which I was unaware. These notes are discussed briefly in Pietro Versace, *I marginalia del Codex Vaticanus* (Vatican City: Biblioteca apostolica vaticana, 2018), pp. 14–18 (thanks to Grenz for the reference). Without first chemically confirming the identity of the ink of the 'cursive' notes in Sinaiticus and the certain corrections of Sinaiticus Scribe D, I hesitate to follow the chain of logic that leads Versace to favor the hypothesis that Sinaiticus and Vaticanus were produced in the same scriptorium.

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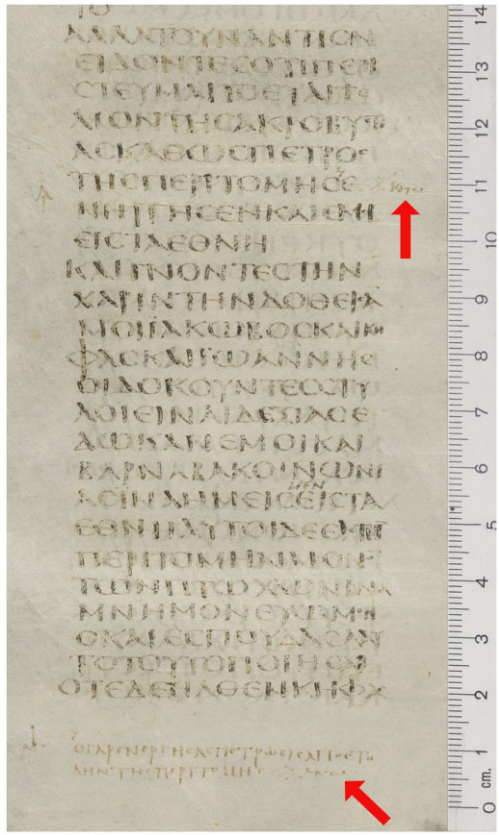

Fig. 1. Samples of 'cursive' writing in Codex Sinaiticus in context marking an insertion before Gal. 2:8, at quire 84, folio 3, recto (British Library, Add MS 43725, © British Library Board)

To begin with, only a portion of these samples can properly be called 'cursive', and these examples are not always very consistent with each other.[32] Beyond that, some of the different scripts and

[32] In discussions of the palaeography of Greek writing of the Roman era, the descriptor 'cursive' carries considerable weight because the number of securely dated examples of cursive writing is much greater than the number of securely dated examples of 'literary' writing. Thus, it is generally assumed that it is easier to establish more precise and accurate palaeographic dates for samples of undated cursive writing by comparison to dated samples. Yet, Eric Turner has sounded a note of caution on this score, pointing out 'how little

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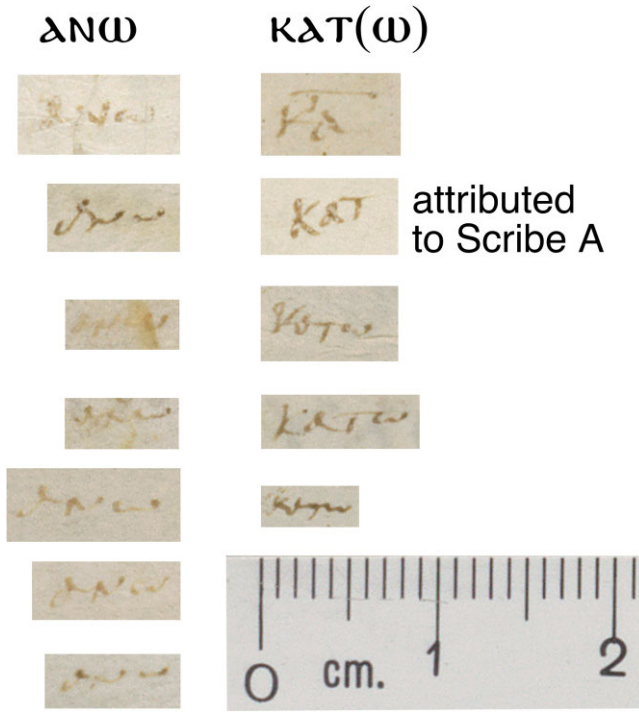

Fig. 2. Samples of 'cursive' writing in Codex Sinaiticus attributed to scribe D by Milne and Skeat, unless otherwise noted (British Library, Add MS 43725, © British Library Board)

individual letter forms represented in the notes seem to me to be paralleled by examples at least as late as the first quarter of the fifth century. A few comparisons will illustrate the point.

For the samples of the word *ανω* that are written in what are essentially upright or inclined majuscules, we can see similar letter forms and spacing in P.Mich.inv. 6223, a receipt copied in 406 C.E. (see Fig. 3).[33]

truth there is in the facile, often repeated dictum that cursive, quickly written handwritings are easier to date than literary hands. Both types of activity are equally aleatory'. See Turner, 'Writing Material for Businessmen', *BASP* 15 (1978), pp. 163–9, at p. 164.

[33] See Herbert C. Youtie, 'P.Mich.inv. 6223: Transtigritani', *ZPE* 21 (1976), pp. 25–6.

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Fig. 3. Script of notes in Codex Sinaiticus (top) compared with script of P.Mich.inv. 6223 (bottom); images are not to scale. Codex Sinaiticus: British Library, Add MS 43725, © British Library Board; Images of P.Mich.inv. 6223 appear courtesy of the Papyrology Collection, Graduate Library, The University of Michigan

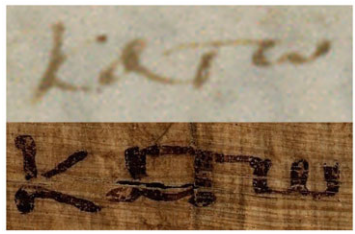

Fig. 4. Script of note in Codex Sinaiticus compared with script of PSI 16 1576 (420–421 C.E.); images are not to scale; Codex Sinaiticus: British Library, Add MS 43725, © British Library Board; PSI 16 1576 (PSI inv. 3779): © Istituto Papirologico 'Girolamo Vitelli', Università degli Studi di Firenze

For the similarly non-cursive examples of κατω, we can compare the same sequence of letters in PSI 16 1576, a copy of the ninth festal letter of Cyril of Alexandria, written for the year 420–421 C.E. (see Fig. 4).[34]

[34] See Guido Bastianini and Guglielmo Cavallo, 'Un nuovo frammento di lettera festale (PSI inv. 3779)', in Guido Bastianini and Angelo Casanova (eds.), *I papiri letterari cristiani: Atti del convegno internazionale di studi in memoria di Mario Naldini* (Florence: Istituto Papirologico 'G. Vitelli', 2011), pp. 31–45. The script of PSI XVI 1576 is a classic example of the so-called Alexandrian Majuscule. I do not wish to say that any of the meager selection of letters from the notes in Codex Sinaiticus should be classified in this way; I

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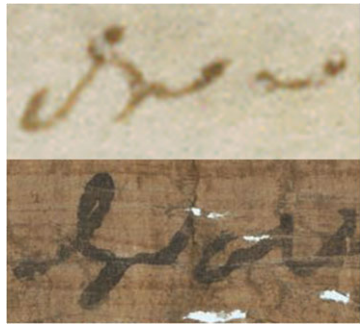

Fig. 5. Script of cursive note in Codex Sinaiticus compared with script of P.Berl. Zill. 5 (417 C.E.); images are not to scale; Codex Sinaiticus: British Library, Add MS 43725, © British Library Board; P. Berl.Zill. 5: © Ägyptisches Museum und Papyrussammlung—Staatliche Museen zu Berlin, Scan: Berliner Papyrusdatenbank, P 11353

For the more truly cursive sample of the word *avω*, we can see the same basic sequence of strokes and lifts of the stylus in P.Berl. Zill. 5, a contract copied in 417 C.E. (see Fig. 5).[35]

I do not wish to deny that we also find samples with scripts similar to these in documents securely datable to the fourth century. We surely do. But as the examples in Figs. 3–5 indicate, these types of writing persisted into the first part of the fifth century. I am not aware of samples of these kinds of scripts in dated documents later than the period represented here (that is, the first quarter of the fifth century).[36] Thus, if Milne and Skeat are indeed correct that one of the copyists of the codex is responsible for these notes, then a date in the early fifth century for the production of the codex cannot be ruled out.

At the end of the day, then, where do the 'objective' criteria presented by Roberts leave us? We have a rough *terminus post quem* in the first half of the fourth century provided by the presence of the Eusebian apparatus. Our *terminus ante quem*, the small group of 'cursive' words, allows for a date as extending into the first part of the fifth century. These criteria thus provide us with a

am only pointing out that the use of similar isolated majuscule letter forms is attested in the early fifth century.

[35] See Henrik Zilliacus, *Vierzehn Berliner griechische Papyri: Urkunden und Briefe* (Helsinki: Societas Scientiarum Fennica, 1941), pp. 39–46.

[36] This does not mean that no such examples exist, just that if they do, they have not come across my desk.

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range of possible dates for the manufacture of Codex Sinaiticus that runs from the first half of the fourth century through the first part of the fifth century, let us say, 300 C.E.—425 C.E. A date range this wide is appropriate given the types of evidence available to us. But there may be a possibility for narrowing this date by employing other tools that we have so far neglected.

3. The Potential of Radiocarbon Analysis

Although radiocarbon dating is not the miracle solution that it is sometimes imagined to be for the dating of manuscripts, in this particular case the technology presents some real promise for increasing our knowledge of Codex Sinaiticus.[37] Successful radiocarbon analysis of parchment samples is now quite common.[38] Although the technique remains destructive (samples are incinerated in order to access their carbon content), the technology of accelerator mass spectrometry has reduced the amount of material needed for sampling to as little as 10–20 mg of material. This equates to less than 1 cm^2 of parchment in terms of surface area, and the sample need not be a regular shape—an extremely thin strip or irregular shape is as good as a square.[39] Very recently, successful analysis has been carried out on parchment samples of just 0.3 mg (about 3 mm^2 of surface area).[40] So, we are talking about a truly minuscule amount of material being lost in order to gain important insights about the codex. Indeed, the particular range of possible dates established above for the production of Codex Sinaiticus would appear to be especially amenable to

[37] For a technical introduction, see R. E. Taylor and Ofer Bar-Yosef, *Radiocarbon Dating: An Archaeological Perspective* (2nd edn., Walnut Creek, California: Left Coast Press, 2014). For the specific benefits and drawbacks of the use of radiocarbon analysis on papyrus and parchment manuscripts, see Nongbri, *God's Library*, pp. 72–80.

[38] For general discussion of the analysis of parchment and pre-treatment methods, see Fiona Brock, 'Radiocarbon Dating of Historical Parchments', *Radiocarbon* 55 (2013), pp. 353–63. For an excellent overview of the recent radiocarbon dating of early Islamic manuscripts copied on different media, see Eva Mira Youssef-Grob, 'Radiocarbon (^{14}C) Dating of Early Islamic Documents: Background and Prospects', in Andreas Kaplony and Michael Marx (eds.), *Qur'ān Quotations Preserved on Papyrus Documents, 7^{th} – 10^{th} Centuries and the Problem of Carbon Dating Early Qur'āns* (Leiden: Brill, 2019), pp. 138–87.

[39] See, e.g., Youssef-Grob, 'Radiocarbon (^{14}C) Dating of Early Islamic Documents,' p. 181.

[40] See T. M. Kasso, M. J. Oinonen, K. Mizohata, J. K. Tahkokallio, and T. M. Heikkilä, 'Volumes of Worth—Delimiting the Sample Size for Radiocarbon Dating of Parchment', *Radiocarbon* 63 (2021), pp. 105–20.

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radiocarbon analysis for reasons that will hopefully become clear after a brief description of the process.

Radiocarbon analysis measures the amount of the radioactive isotope carbon-14 (^{14}C) in a deceased organic artifact and compares that amount to the amount that was present at the point when the organism died.[41] To translate these measurements into calendar years, scientists established an equation based on the known rate that ^{14}C decays. Putting the measured amount of ^{14}C from the sample into the equation produced a result given in terms of 'radiocarbon years' (^{14}C years) before present (BP). The word 'present' stands for the year 1950. This calculation presumed that the level of ^{14}C in the atmosphere is constant, but we now know that this is not the case. So, to improve their translation guide, radiocarbon scientists have tested many objects of known age, usually trees, whose exact ages can be known through dendrochronology—counting the growth rings. By testing many objects with known ages, scientists have been able to determine how the levels of ^{14}C in the atmosphere have fluctuated over the centuries and to create calibration curves that help them adjust the original results of their equation for improved calendar accuracy.[42]

To better understand the particular benefit of a radiocarbon analysis of Codex Sinaiticus, we may turn to a recent version of the calibration curve, IntCal20 (Fig. 6).[43]

Because of irregular fluctuations in the amount of ^{14}C in the atmosphere, the calibration curve is not a smooth line. It instead has a more jagged shape with 'wiggles' throughout. For some ranges of calendar dates (such as the years 430 C.E. to 530 C.E.) the curve is nearly horizontal. In these cases, the results of radiocarbon analysis may be less precise (that is, they may yield a wide range of calendar dates). For other ranges of calendar dates, such

[41] Given the excellent quality of parchment used in Codex Sinaiticus, I assume that the skins were prepared specifically for the production of the codex and that the animals were killed at a time not very long before the codex was produced. For a discussion of the parchment in Sinaiticus, see Gavin Moorhead, Sara Mazzarino, Flavio Marzo, and Barry Knight, 'A Physical Perspective of Codex Sinaiticus: An Overview from the British Library Folios', in McKendrick, Parker, Myshrall, and O'Hogan, *Codex Sinaiticus: New Perspectives*, pp. 221–38.

[42] I am grateful to Josephine Dru for help in accurately formulating this summary.

[43] On IntCal20, see Paula J. Reimer et al., 'The IntCal20 Northern Hemisphere Radiocarbon Age Calibration Curve (0–55 CAL kBP)', *Radiocarbon* 62 (2020), pp. 725–57.

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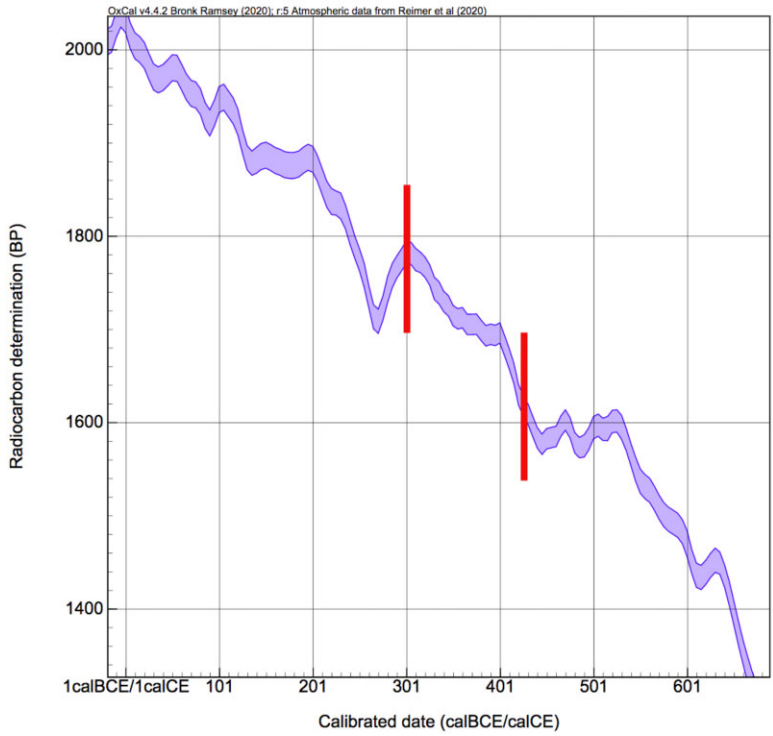

Fig. 6. IntCal20 radiocarbon calibration curve; the vertical axis shows the number of radiocarbon years before present (BP) and the horizontal axis shows calendar years (calBCE and calCE) with the segment for the calendar years 300 to 425 C.E. marked by red bars

as the years 240 C.E. to 300 C.E., a 'wiggle' can become a prominent dip, raising the possibility that radiocarbon analysis would yield large ranges or even multiple, discontinuous ranges of calendar dates. And in other areas, the curve is more nearly vertical across some ranges of calendar dates, such as the period between 520 C.E. and 600 C.E. Radiocarbon analysis has the potential to yield more precise calendar dates for objects made of materials that died in the periods of time that correspond to these more 'vertical' ranges of the calibration curve.

The spectrum of possible dates established for the construction of Codex Sinaiticus using the relatively objective criteria described above was 300–425 C.E. If we look at what is happening

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to the calibration curve over that period of time (the area between the red lines in Fig. 6), we find that the curve moves steadily downward. What this means is that radiocarbon analysis has a reasonably good chance of providing informative new data about the date of the parchment writing surface of Codex Sinaiticus. The hope would be that because of the way atmospheric levels of ^{14}C changed over the period between about 300 C.E. and 430 C.E., the dates resulting from the radiocarbon analysis of Codex Sinaiticus would overlap, *but only partially*, with the range of possible dates established by our 'objective criteria' (that is, about 300–425 C.E.). In that way, the combined data could potentially narrow the span of dates for the production of the codex. For instance, if the results of the radiocarbon analysis included calendar dates in the third century (reflecting the dip in the calibration curve between 240 C.E. and 300 C.E.), we could reasonably exclude these earlier dates on the basis of the presence of the Eusebian numbers. If, on the other hand, the results of radiocarbon analysis included dates in the late fifth or sixth centuries, these could be reasonably excluded on the basis of the presence of the 'cursive' notes. Either way, the results would yield informative data and narrow our range of possible dates for the construction of the codex.

4. Conclusion

While standard reference works give a date of 'ca. 360 C.E.' vel sim. for Codex Sinaiticus, this overly precise mid–fourth century date is more a matter of habit rather than the result of reasoned argumentation based on reliable evidence. Either a date earlier in the fourth century or a date in the later fourth or early fifth century is equally possible. For greater precision and confidence, we need study from new angles, and AMS radiocarbon analysis seems sensible at this juncture. The bulk of Codex Sinaiticus (347 folios) resides at the British Library, but there are also portions at the University of Leipzig (43 folios), St. Catherine's Monastery in the Sinai (at least 18 full or partial folios), and the National Library of Russia in Saint Petersburg (parts of 6 folios). The events that led to the dispersion of the codex are the topic of some disagreement, but the holding institutions, including the earliest known home of the manuscript (St. Catherine's monastery at Sinai), have a cooperative relationship with one another.[44] Let us hope that

[44] For a joint statement of the holding institutions regarding claims to the codex, see at the project website 'History of Codex Sinaiticus' (<https://codexsi

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the custodians of this important artifact can cooperate again, with one or more institutions offering materials for testing.[45] Until such testing or the appearance of new evidence, the range of possible dates for the construction of Codex Sinaiticus should probably be described as early fourth to early fifth century.

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naiticus.org/en/codex/history.aspx>). For a critical analysis of the modern history of the codex, see Christfried Böttrich, 'One Story—Different Perspectives: The Discovery of Codex Sinaiticus', in McKendrick, Parker, Myshrall, and O'Hogan, *Codex Sinaiticus: New Perspectives*, pp. 173–87.

[45] Again, reliable analysis would require only about 1 cm^2 (or less) of uninscribed parchment.